patient is hemodynamically unstable or has evidence of persistent bleeding, however, an exploratory laparotomy and repair of the defect should be done. In a subsequent pregnancy in the patient with a known defect, the safety of a trial of labor has not been established.

With an active program of permitting patients with a prior cesarean birth a trial of labor, the cesarean section rate should begin to decline.

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REFERENCES

Eglinton GS, Phelan JP, Yeh SY, et al: Outcome of a trial of labor after prior cesarean delivery. J Reprod Med 1984 Jan; 29:3-8

Horenstein JM, Phelan JP: Previous cesarean section: The risks and benefits of oxytocin usage in a trial of labor. Am J Obstet Gynecol 1985 Mar 1: 151:564-569

Paul RH, Phelan JP, Yeh SY: Trial of labor in the patient with prior cesarean birth. Am J Obstet Gynecol 1985 Feb; 151:297-304

In Vitro Fertilization and Embryo Transfer

THE FIRST BABY produced by in vitro fertilization and embryo transfer was born in 1978. At that time the procedure had only a 5% success rate, but substantial improvements in our understanding of it have yielded pregnancy rates of 25% to 30% per cycle. Though Steptoe and Edwards originally concluded that the natural cycle produced the greatest chance of success, other investigators have now shown that the "stimulated" cycle is associated with greater pregnancy rates. The Jones program at Norfolk is credited as the first to point out that the greater the number of embryos transferred to a mother, the greater the chance of conceiving (pregnancy rate by transfer: one embryo, 20%; two embryos, 23%; three embryos, 29%). This observation has given rise to a myriad of stimulation protocols using clomiphene citrate, human menopausal gonadotropins (hMG), pure follicle-stimulating hormone or human chorionic gonadotropin (hCG), or all three, to "overstimulate" the ovaries to produce more eggs. Most programs currently use a combination of clomiphene, hMG and hCG. Apparently the risk of the overstimulation syndrome is minimal once follicles are aspirated.

Additional improvements in success rates can be credited to better quality control at the laboratory level. With the development of the mouse embryo assay, items toxic to embryo growth have been identified: glove powder, nonultrapure water, hemolyzed serum supplements and sterilizing rinses.

With the increased number of eggs, and thus embryos produced, increases in multiple-pregnancy rates have occurred. What to do with the "extra" embryos has sparked an interest in cryopreservation technology so the embryos can be stored until transferred in the future during more natural cycles, thus lowering the costs per transfer and decreasing the number of laparoscopies. Contrary to animal cryopreservation successes, however, human pregnancy rates after thawing the embryos have been poor.

Other modifications of in vitro fertilization and embryo transfer have now emerged in attempts to decrease costs and increase success, including ultrasound-guided needle aspiration of follicles and, more recently, the GIFT (gamete intrafallopian transfer) procedure.

The GIFT procedure, developed at San Antonio, Texas, has similar indications to in vitro fertilization and embryo transfer, except that a patient needs to have at least one patent tube. The ovulation induction and monitoring are similar to those for embryo transfer, except that the eggs once captured and identified are immediately loaded into a transfer catheter, along with a portion of the husband's previously washed sperm, and transferred via laparoscopy or minilaparotomy into the patient's tube. Pregnancy success rates on the preliminary data appear to be around 30% and the cost less than the standard embryo transfer procedure.

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REFERENCES

Ackerman SB, Swanson RJ: Culture of mouse preimplantation embryos as a quality control assay for human in vitro fertilization. Gamete Research 1984; 9:145-152

Asch RH, Wong PC, Balmaceda JP, et al: Gamete Intrafallopian Transfer (GIFT)—An Alternative Method of Conception. Read before the annual meeting of the American Fertility Society, Chicago, September 1985

Gynecologic Practice Committee Statement: Human In Vitro Fertilization and Embryo Placement. Washington, DC, American College of Obstetrics and Gynecology, April 1984

Jones HW, Acosta AA, Andrews MC, et al: Three years of in vitro fertilization at Norfolk. Fertil Steril 1984 Dec; 42:826-834

Steptoe PC, Edwards RG: Birth after the reimplantation of a human embryo (Letter). Lancet 1978 Aug 12; 2:366

Rh Immune Globulin Update

ALTHOUGH THE USE of Rh gamma globulin has been widely accepted as an effective method for reducing Rh immunization, there has been considerable controversy concerning its use during the antenatal period. Most physicians agree that administering the material late in a pregnancy further reduces the risk of Rh sensitization when compared with its use only during the postpartum period. The controversy has related to whether or not antenatal administration of Rh immune globulin is cost effective. Much of the immune globulin is clearly wasted because 40% of the pregnancies of Rh-negative mothers result in Rh-negative babies. Geoffrey Tovey has stated that if one uses the material during the pregnancy and the postpartum period, four times as much gamma globulin will be required as compared with its use in the postpartum period only. An alternative to the recommendation of Bowman and others that it be used antenatally in *all* pregnancies has been proposed by L.A.D. Tovey, who recommends that it be used only in primigravid Rh-negative women and in those women who in their first pregnancy were delivered of an Rh-negative infant. The important point to remember is that the greatest risk of stillbirth is during the first Rh-positive pregnancy. Contrary to the thought that was many times expressed in the early literature, the chances of Rh sensitization do not increase with each pregnancy. Although 8% of all "first affected" pregnancies end in stillbirth, the likelihood of death in later pregnancies is much reduced. Tovey asserts that with the plan proposed by him, all Rh-negative mothers can have three live babies.

Although it is my personal belief that the intrapartum use of Rh immune globulin is needed for only the first Rh-positive baby, I have not been able to get other clinicians to adopt this program. The following is a description of the practice used by the obstetricians at Long Beach (California) Memorial

Medical Center. The antenatal injection of Rh immune globulin is frequently given in the physician's office. Our recommended protocol is that blood typing and antibody screening be done early in the pregnancy. If Rh-negative, the woman returns at 28 weeks' gestation for a repeat antibody screen. The antenatal Rh immune globulin is then administered. If it was given at 16 to 18 weeks' gestation following amniocentesis for genetic analysis, then a second dose is given at 28 weeks. A record of the antenatal injection is sent to the blood bank at the hospital where the patient's infant is to be delivered. Following the delivery, if the infant is Rh-positive, a postpartum injection of Rh immune globulin is given to the mother within 72 hours of parturition.

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REFERENCES

Bowman JM: Controversies in Rh prophylaxis, *In* Garratty G (Ed): Hemolytic Disease of the Newborn. Arlington, Va, American Association of Blood Banks, 1984, pp 67-85

Mollison PL: Some aspects of Rh hemolytic disease and its prevention, *In* Garratty G (Ed): Hemolytic Disease of the Newborn. Arlington, Va, American Association of Blood Banks, 1984, pp 22-23

Tovey GH: Should anti-D immunoglobulin be given antenatally? Lancet 1980 Aug 30; 2:466-468

Tovey LAD, Taverner JM: A case for the antenatal administration of anti-D immunoglobulin to primigravidae. Lancet 1981 Apr 18; 1:878-881

Chorionic Villus Sampling

IN THE PAST DECADE, with the emergence and development of prenatal diagnosis, amniocentesis, because of its safety and reliability, has become the accepted technique for detecting genetic disorders. Despite wide acceptance, alternatives to amniocentesis have been sought because it cannot be done until the second trimester of pregnancy and requires two to four weeks for results to be available. As a result of research in several institutions around the world, a first-trimester method for obtaining fetal tissue specimens, known as chorionic villus sampling, has emerged.

A specimen is taken of the chorionic villus between 9 and 12 weeks from the last menstrual period. Using real-time sonographic guidance, a 16-gauge polyethylene catheter is placed within the chorion frondosum and a small specimen of villi (5 to 30 mg) is removed by aspiration. The villus specimen is placed in culture for cytogenetic analysis or analyzed directly for certain biochemical or DNA studies. In addition, techniques are being developed to obtain chromosome results in as few as 48 to 72 hours.

The indications for chorionic villus sampling are similar to those for amniocentesis and include advanced maternal age, the presence of a chromosomal translocation in one parent, the birth of a previous trisomic child and a family at risk for a specific biochemical or metabolic disorder.

The major complications related to the procedure are spontaneous abortion and infection. Although the risk of spontaneous abortion directly related to the procedure is unknown, preliminary information suggests it to be relatively low (1% to 3%). There also appears to be a slight but significant risk of infection related to the procedure. Included among complications are diagnostic errors, the major sources of error being maternal cell contamination of the specimen. Meticulous attention to dissecting the villi from decidual tissue and careful processing of the material are essential and should minimize this complication.

With more than 3,000 patients now having delivered following chorionic villus sampling, there is no indication of an increased risk for long-term fetal or maternal complications. More complete information on the safety and reliability of this procedure should be forthcoming from the controlled studies now ongoing under the auspices of the National Institute of Child Health and Development. Preliminary experience would suggest, however, that chorionic villus sampling has the potential to become a widely accepted alternative to amniocentesis for detecting genetic disorders prenatally.

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REFERENCES

Elias S, Simpson JL, Martin AO, et al: Chorionic villus sampling for first-trimester prenatal diagnosis: Northwestern University Program. Am J Obstet Gynecol 1985 May 15; 152:204-213

Harrison MR, Golbus MS, Filly RA: The Unborn Patient: Prenatal Diagnosis and Treatment. Orlando, Fla, Grune & Stratton, 1984

Use of Lasers for the Treatment of Squamous Cell Carcinoma In Situ of the Uterine Cervix

OVER THE PAST TWO DECADES, the evaluation and management of most cases of carcinoma in situ of the uterine cervix have progressed from a hospital operating room to a physician's office or surgicenter. Diagnostic conization has been replaced by colposcopically directed punch biopsies if the colposcopy is satisfactory and the endocervical currettage elicits no abnormalities. Therapeutic conization or hysterectomy for carcinoma in situ has been replaced in most cases by cryosurgery if the lesion is small and the carbon dioxide laser for medium-sized to large lesions. The carbon dioxide laser has been used in thousands of cases and the success rate exceeds 95% in an experienced physician's hands. The laser beam is used primarily for tissue vaporization but also can be used as an excisional cone to replace the standard cold conization. The indications for laser conization are identical to those for the cold conization.

This "space age" technique is not without limitations. First, a physician must have mastered the technique of colposcopy. Next, a didactic course in laser principles and techniques with hands-on experience is mandatory. Preceptorships are highly recommended. Because of the potential for harm with inappropriate use, privileges to do the technique must be carefully monitored and granted with the same care accorded major surgical procedures. Instruments are not inexpensive, with costs ranging between $20,000 and $100,000. Consequently, most lasers are found in outpatient facilities or surgicenters. Group or referral practices may have a laser in the office, however.

When doing laser vaporization in the office, local anesthesia is used to eliminate the pain caused by heat buildup. Posttreatment pain is seldom a problem. Exercise is discouraged after therapy to lessen the chance of bleeding. Healing occurs in four to six weeks. Fertility, labor and delivery have